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fields at Summit, Schoharie Co., N. Y., and a friend found it at Saratoga. At New Lots I have seen young trees of *Pawlonia* growing along fence rows; *Medicago sativa* in an uncultivated field, and *Trifolium hybridum* is common, as it is in Brooklyn and elsewhere on the western part of Long Island. At Fresh Pond is a patch of *Stellaria graminea*. At Maspeth *Chelidonium majus* is permanent. My wife found *Trifolium incarnatum* growing in an open field on Shelter Island. *Apium nodiflorum* was found at Forbell's Landing, probably not established.

Asclepias obtusifolia, *Tephrosia Virginiana* and *Euphorbia Ipecacuanhæ* are common in Woodhaven; *Kalmia latifolia*, *K. angustifolia* and *Calopogon tuberosus*, forma *albiflorus*, occur at Forbell's Landing, as also *Lysimachia thyrsiflora*, *Gerardia purpurea*, forma *albiflora*, *Sabbatia stellaria*, forma *albiflora*, *Aster concolor* and *Aster Nova-Angliæ*, forma *albiflora*. *Liparis liliifolia* and *Aralia hispida* occur in Cypress Hills Cemetery.

GEORGE D. HULST.

Eatonia Dudleyi, Vasey, in Connecticut. This grass was found by the writer, in May, 1890, near Shelden's Cove, in the town of Lyme. It grew in fair abundance upon wooded slopes, bordering the creek. This species has not hitherto, so far as I know, been reported from New England. I have to thank Dr. Watson and Prof. Eaton, for confirming the identity of specimens from this locality.

CHARLES B. Graves, M. D.

NEW LONDON, CONN.

A Correction. In Mr. Fernald's list of Maine plants, April BULLETIN, *Hypericum Canadense*, var. *minimum*, should be omitted. [Eds.]

Reviews of Foreign Literature.

Protoplasmic Union between the Neighboring Elements of the Plant.—In the *Botanische Zeitung*, beginning January 2d, 1891, and ending January 30th, is a long article by F. Kienitz-Gerloff with the above title. It is much too long to give a fair idea of its contents in the space allotted the reviewer, but a summary of his results and conclusions is as follows: After explaining the methods of investigating, a long list of plants is given in which this continuity of protoplasmic threads was observed. The list begins with the Hepatics and ends with the Compositæ. He gives the two theories regarding the function of these threads, first, that they serve as conductors of dynamic stimulus, second, as a means for conducting the various food elements to the different parts of the plant.

According to the first, the sieve-tubes and their contents correspond to the nerves of the animal. He gives the opinions of Pfeffer, Haberlandt, and many others in favor of this theory, and quotes from Pfeffer that even the cell wall may contribute to this effect by the motion of its particles uniting with that of the protoplasma molecules. All these authors agree, in general, that this conduction of stimulus is one function of the continuous protoplasmic threads. There is, however, much less unanimity in regard to the second theory. Various objections are quoted; among others, the exceeding fineness of the perforations in the wall through which the threads pass. The author thinks this objection of little value, even if it were not possible to show in many cases that the perforations were of considerable size.

He says that if we discard this theory, which, in general, has reference to the passage of organic material, we must suppose this material finds its way through much finer channels, namely, between the molecular interstices of the wall, either by filtration or osmosis. Here is given the experiment of De Vries to show that by diffusion alone, even those substances conveyed the most rapidly, e. g., cane-sugar and salt, would find too slow transport to meet the needs of the plant. According to this experiment it would take a milligram of salt in a ten per cent. solution three hundred and nineteen days to move the distance of a meter in water. Albuminous substances would require fourteen years.

By comparing the results obtained by his own studies with those of many others, the author decides that an important function of these threads is the transport of organic matter to various parts of the plant. Furthermore, that they may serve as conductors of stimulus, as by their means the whole protoplasmic contents may be withdrawn from one part of the plant to another. This latter view, he says, may account for the entire lack of protoplasm in the ducts and schlerenchymatic cells whose walls are completed in thickness. As soon as this thickening process is completed the protoplasm is withdrawn to neighboring cells, where it may be of further service in the plant economy. The same hypothesis also explains the cause of the sudden disappearance of protoplasm in the autumn leaves of deciduous trees. The contents of the leaf cells, on the approach of cold or other disagreeable environment, suddenly wander back through the petioles into the stem, just as the plasmodium withdraws an arm when it comes in contact with anything disagreeable.

This view, he says, is sustained by the fact that among the large numbers of fallen leaves already withered and sere, which he examined, no trace of protoplasm was found except in the guard cells of the stomatæ. Here occurred both protoplasm and chlorophyll grains. In all his previous examinations of healthy leaves, no trace of protoplasmic union between these .cells and those surrounding them was found. Therefore it would be impossible for them to lose their contents by the means suggested. In answer to the question, how they obtained their supply in the first place? he says they may have received protoplasm and chromatophores when first cut off from the neighboring epidermal cells, and that probably these contents were at first connected with those of the neighboring cells, and later the perforations were closed. According to this notion they must have been obliged to furnish all their own organic nourishment after this separation occurred. The reason for this isolation he finds in the supposition that were they subject to the otherwise universal exchange of organic material they would, at times, be deprived of turgor-producing substances, so fail in their office of opening and closing.

In conclusion, he states that in germinating seeds no union exists between the protoplasm of the embryo and that of the neighboring cells, neither is it found between the haustoria of parasitical plants and the cells of their hosts. This facts offers no objection to his view, as according to it, only the organic material, which is insoluble in water, is transferred by these protoplasmic threads. Wortmann has shown that the change of starch to a material soluble in water is accomplished by diastase only in the holders of reserve material, such as starch-holding seeds, etc. Accordingly solutions occurs here which may feed the plant by osmotical processes.

No union was found to exist between the cells of low plants where each cell is able to perform all the metabolic functions. An exception to this statement must perhaps be made of the *Volvox* and certain others of this family. The fungi were not examined.

E. L. G.

Recent Literature on the Diatomaceæ.

Diatomaceæ of North America. Rev. Francis Wolle.

There has long been an urgent demand for a work upon diatoms at a reasonable cost. Dr. Wolle has met this want admirably in the present work. Students of the Diatomaceæ will also appreciate the work which the author has done in bringing together a large number of illustrations that have heretofore been almost inaccessible, for it is well known that the literature bearing upon the subject is scattered and costly. A valuable feature is the reprinting from "The Lens," of Prof. H. L. Smith's "Conspectus of the Families and Genera of the Diatomaceæ." It would have been well, however, if Dr. Wolle had refrained from specifying certain genera in the Conspectus, as not North American. Several of the genera thus indicated are undoubtedly North American.

The plates, 112 in number, are well executed. It is to be regretted that a rather large list of errata in the text has been rendered necessary, owing to the author's serious illness, while the work was in course of publication.

Atlas der Diatomaceen-kunde. A. Schmidt.

Fascicles 39 and 40 have just been issued, thus bringing the work up to Plate 160. Sendai, Oamaree, and Atlantic City, each contribute a number of new species. The continued disability of the veteran diatomist, Herr Grunow, has prevented his assistance in preparing the present number.

On the Structure of the Pleurosigma Valve. T. F. Smith, F. R. M. S.

Diatom Structure—The Interpretation of Microscopical Images. Jacob D. Cox, LL.D., F.R.M.S. (Journal of New York Microscopical Society, Vol. vii. No. 2. April, 1891).

Recent improvements in microscopical objectives have rendered possible far more accurate information in regard to the